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ESTIMATED PREVALENCE  
OF BLINDNESS  
*in the United States*

By RALPH G. HEILIN

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PUBLICATIONS

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## *Foreword*

The actual number of blind persons in the United States is the subject of perennial question since there is no detailed census which provides that information. The United States Census Bureau for many decades attempted to include an enumeration of the blind in its regular decennial census of the population. It developed, however, that no matter how great the care taken, the figures reported never seemed accurate or reliable. The difficulty of applying uniformly a definition of blindness and the unwillingness of some families to admit the presence of a blind family member were some of the reasons why the reporting tended to be seriously incomplete. The census authorities themselves recognized these weaknesses, and as a result, no census of the blind was made in the population census of 1940 or in any later census.

The Committee on Statistics of the Blind, jointly sponsored by the American Foundation for the Blind and the National Society for the Prevention of Blindness was appointed in 1929 to study the problems of statistics of blindness and the blind and make recommendations for the improvement of such statistical data. The author of this pamphlet, Dr. Ralph G. Hurlin, has been the chairman of the committee since its establishment.

The work of the Committee on Statistics has resulted in a number of surveys and estimates, with each new estimate always showing an upward revision of its figures. The present study indicates that there are 308,000 blind persons in the United States. It is interesting to compare this figure with that of 63,489, the last census of the blind by the United States Census Bureau of 1930. It is obvious that the problem of obtaining reliable statistics on the blind is one that requires special methods and formulas. We are grateful to Dr. Hurlin for this painstaking and conscientious work. It will prove of inestimable value to officials of welfare agencies and workers for the blind alike.

The text of this pamphlet has been reprinted from the *Social Security Bulletin*, July, 1953, with the permission of its editors.

M. ROBERT BARNETT  
EXECUTIVE DIRECTOR



## Estimated Prevalence of Blindness in the United States

BLINDNESS IS A SERIOUS physical handicap but one that varies in degree of severity; much of it could, with the knowledge now available, be prevented or deferred. In practice the term "blindness" denotes loss of sight ranging from total inability to distinguish light from darkness to only a visual defect preventing the successful pursuit of the usual, normal activities for which vision is needed. Partly because of the variation in severity, reliable statistics on the prevalence of blindness have long been generally lacking.

Accurate statistics on the numbers of blind persons, periodically compiled, are much needed, however, for use in evaluating the results of measures taken to control blindness and also in planning and administering programs of both service and assistance for the blind. Lack of such statistics prevents, for example, safe conclusions as to whether, notwithstanding great advances in medical treatment relating to some of its most important causes, the rate of prevalence of the handicap in this country has been increasing or decreasing during the last few years.

In the absence of dependable statistics resulting from enumerations of blind persons, attempts have been made to estimate the prevalence of blindness. The figures presented in Table 1 bring forward to 1952 estimates prepared earlier by the author,<sup>1</sup> in which a common formula has been used to obtain the probable numbers of blind persons in each state and in the continental United States. The table contains both the rates of blindness found by application of the formula and the numbers of blind persons obtained by applying the rates to the Bureau of the Census estimates of population on July 1, 1952. It also contains for each state and for the nation the values of three factors used in estimating the differences to be expected in the rates of prevalence in different states.

These statistics relate to the concept of blindness now in general use in this country—that is, "economic blindness." When title X (Grants to States for Aid to the Blind) of the Social Security Act became effective, the Bureau of Public Assistance recommended

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<sup>1</sup> *Social Security Bulletin*, March 1945, pp. 17-18, and September 1950, pp. 9-10.

to the states that they adopt as a condition of eligibility this concept and suggested a definition based on one already in use.

### *Definition of Blindness*

A specific definition of economic blindness had been adopted two years earlier by the American Medical Association, as a result of a request from the Illinois Department of Welfare for a definition of blindness in scientific terms that might be made statutory. The Association's section on ophthalmology recommended definitions of several grades of blindness, which were formally adopted by the Association. Total blindness was defined as inability to perceive light, or lack of light perception. Economic blindness was defined first in general terms, as absence of ability to do any kind of work, industrial or otherwise, for which sight is essential, and then specifically, as "visual acuity of less than one-tenth," which was explained as meaning that "objects can be recognized only when brought within one-tenth of the distance at which they can be recognized with standard vision. Such vision in the better eye when corrected with the best possible glass would be recorded as less than 0.1 or 6/60 or 20/200, or as an equally disabling loss of the visual field."<sup>2</sup>

The states participating in the federal-state program of aid to the blind were not required to accept a uniform definition of visual handicap as a condition of eligibility for this form of assistance. The Bureau of Public Assistance did recommend, however, that the definition adopted by each state be expressed in terms of ophthalmic measurements, and it proposed a definition adapted from that of the American Medical Association but more inclusive. The suggested definition included, while the Association's definition omitted, the measurement 20/200, or ability to see at 20 feet with proper correction what persons with normal vision see at 200 feet. It also made specific the extent of visual field defect that should be regarded as constituting an equally disabling loss.

Most of the states, in initiating programs of aid to the blind under the Social Security Act, accepted the proposed definition either without any change or with only verbal modification that

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<sup>2</sup> *Journal of American Medical Association*, Vol. 102, No. 26, 1934, p. 2205.

did not alter its effect. There are, however, exceptions. Pennsylvania's definition limits eligibility for assistance to persons with central visual acuity of less than 20/200, but it is one of several states that omit from the definition any reference to a defect of the field of vision. Missouri's definition limits eligibility to persons with central visual acuity up to but not including 5/200 and certain persons with a defect of the visual field.

The omission of reference to deficiency in the field of vision, though significant, is not likely to make a large difference in the number of persons covered by the definition. On the other hand, the inclusion or exclusion of the measurement 20/200 can be expected to make a substantial difference in the number of persons who should be counted as blind in any attempt to enumerate such persons. Thus, to cite one example, in Massachusetts 15 percent of the 306 persons accepted for aid to the blind during the fiscal year 1951-52 had central visual acuity recorded as exactly 20/200.<sup>3</sup>

It must be recognized, however, that no attempt to count blind persons can be expected to enumerate successfully all those persons whose deficient vision would, if tested, be recorded at the upper limit of the definition. Many persons who have such marginal defect do not regard themselves as blind and therefore do not come to the attention of the enumerator, or case finder, in any practicable procedure of enumeration or registration of blind persons. Thus the reservation should be made that the present estimates are presumed to represent persons who are blind within the definition of economic blindness and who recognize an effective handicap, or those who are effectively visually handicapped to this extent.

### *Method of Estimation*

Two basic assumptions were made in arriving at the estimated rates of prevalence of blindness for the states—that the rates will vary from state to state, and that the rate for each state will be determined chiefly by the composition of its population with respect to age and race and by the state's public health standards. The first step in the procedure was, therefore, to estimate relative differences in rates of prevalence. Numerical values chosen to represent the

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<sup>3</sup> Massachusetts Department of Education, *Annual Report of the Division of the Blind, Year Ended June 30, 1952*, p. 23.

three factors—age of population, nonwhite component of population, and health standards—were combined. The percentages for the first two factors are satisfactory measurements for the purpose and were readily available in reports on the recent (1950) population census.

No similarly convenient measure is available to express the relative success of public health efforts. In the absence of such a figure, the infant death rate has been taken as the best available index of the standard of public health maintenance as it affects all portions of the population in each of the states. Averages of the infant death rates for the 5 years 1941-45 have been used, rather than more recent figures, to reflect conditions existing when more of the present blind persons were becoming blind. The average rates for these years, for the states and for their urban, rural, and semirural areas, were compared in a report of a Committee for the Study of Child Health Services of the American Academy of Pediatrics in 1949.<sup>4</sup> A similar comparison made by the Children's Bureau for the years 1944-48 shows rates that are lower than those used here but that are in closely similar proportion.<sup>5</sup>

There can be no doubt that the proportion of older persons in the population is now one of the principal factors determining the number of blind persons. Many diseases that cause blindness—including the two now most frequent causes, cataract and glaucoma—occur chiefly in the later years of life. While increasing longevity has increased the relative importance of eye disease associated with age, medical science has been reducing spectacularly the incidence of blindness from infectious diseases, which probably once accounted in this country—as it still does in some parts of the world—for the greater part of blindness.

All attempts to enumerate blind persons in sections of the country in which there is considerable nonwhite population have shown much higher prevalence rates for nonwhite than for white persons. This relationship was found in the canvass of more than 700,000 urban families in sample areas of 18 states made by the National Health Survey in 1935-36. In that study the persons enumerated as

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<sup>4</sup> Commonwealth Fund, *Child Health Services and Pediatric Education*, New York, 1949.

<sup>5</sup> *Infant and Maternal Mortality in Metropolitan and Outlying Counties, 1944-48* (Children's Bureau Statistical Series, No. 12), 1952.

Table 1.—Estimated rates of blindness in continental United States as of July 1, 1952, by State

| Region and State          | Blind persons                                    |                               | Factors underlying estimates  |                       |                                    |
|---------------------------|--|-------------------------------|-------------------------------|-----------------------|------------------------------------|
|                           | Estimated rate per 1,000 population <sup>1</sup> | Estimated number <sup>2</sup> | Percent of population, 1950   |                       | Infant death rate, average 1941-45 |
|                           |  |                               | Aged 65 and over <sup>3</sup> | Nonwhite <sup>3</sup> |                                    |
| Total.....                | 1.98   | 308,419                       | 8.2                           | 10.3                  | * 40.0                             |
| New England:              |  |                               |                               |                       |                                    |
| Maine.....                | 2.11   | 1,865                         | 10.2                          | .3                    | 48.3                               |
| New Hampshire.....        | 1.87   | 1,006                         | 10.9                          | .2                    | 39.0                               |
| Vermont.....              | 1.86   | 692                           | 10.5                          | .1                    | 39.8                               |
| Massachusetts.....        | 1.64   | 7,864                         | 9.6                           | 1.4                   | 33.2                               |
| Rhode Island.....         | 1.71   | 1,397                         | 8.9                           | 1.9                   | 36.4                               |
| Connecticut.....          | 1.52   | 3,197                         | 8.8                           | 2.7                   | 30.0                               |
| Middle Atlantic:          |  |                               |                               |                       |                                    |
| New York.....             | 1.68   | 25,501                        | 8.7                           | 6.3                   | 32.4                               |
| New Jersey.....           | 1.67   | 8,522                         | 8.4                           | 5.7                   | 33.2                               |
| Pennsylvania.....         | 1.87   | 19,947                        | 8.6                           | 6.2                   | 38.9                               |
| East North Central:       |  |                               |                               |                       |                                    |
| Ohio.....                 | 1.90   | 15,531                        | 9.5                           | 5.9                   | 38.4                               |
| Indiana.....              | 1.81   | 7,428                         | 9.2                           | 4.5                   | 37.3                               |
| Illinois.....             | 1.71   | 15,250                        | 8.6                           | 7.2                   | 32.9                               |
| Michigan.....             | 1.76   | 11,806                        | 7.1                           | 7.1                   | 37.6                               |
| Wisconsin.....            | 1.59   | 5,627                         | 9.0                           | 1.2                   | 33.0                               |
| West North Central:       |  |                               |                               |                       |                                    |
| Minnesota.....            | 1.54   | 4,652                         | 9.0                           | 1.0                   | 31.4                               |
| Iowa.....                 | 1.68   | 4,444                         | 10.4                          | .8                    | 33.5                               |
| Missouri.....             | 2.08   | 8,436                         | 10.8                          | 8.0                   | 40.1                               |
| North Dakota.....         | 1.58   | 948                           | 7.8                           | 1.8                   | 34.7                               |
| South Dakota.....         | 1.72   | 1,142                         | 8.5                           | 3.7                   | 36.2                               |
| Nebraska.....             | 1.65   | 2,262                         | 9.8                           | 1.8                   | 33.0                               |
| Kansas.....               | 1.78   | 3,564                         | 10.2                          | 4.0                   | 34.5                               |
| South Atlantic:           |  |                               |                               |                       |                                    |
| Delaware.....             | 2.22   | 750                           | 8.3                           | 13.9                  | 45.0                               |
| Maryland.....             | 2.16   | 5,456                         | 7.0                           | 16.6                  | 43.4                               |
| District of Columbia..... | 2.81   | 2,346                         | 7.1                           | 35.4                  | 49.5                               |
| Virginia.....             | 2.51   | 8,780                         | 6.5                           | 22.2                  | 51.5                               |
| West Virginia.....        | 2.22   | 4,331                         | 6.9                           | 5.7                   | 54.1                               |
| North Carolina.....       | 2.47   | 10,318                        | 5.5                           | 26.6                  | 48.6                               |
| South Carolina.....       | 3.07   | 6,539                         | 5.4                           | 38.9                  | 58.5                               |
| Georgia.....              | 2.61   | 9,174                         | 6.4                           | 30.9                  | 48.0                               |
| Florida.....              | 2.49   | 7,719                         | 8.6                           | 21.8                  | 47.0                               |
| East South Central:       |  |                               |                               |                       |                                    |
| Kentucky.....             | 2.20   | 6,415                         | 8.0                           | 6.9                   | 50.2                               |
| Tennessee.....            | 2.28   | 7,426                         | 7.1                           | 16.1                  | 47.5                               |
| Alabama.....              | 2.66   | 8,116                         | 6.5                           | 32.1                  | 48.6                               |
| Mississippi.....          | 2.96   | 6,432                         | 7.0                           | 45.5                  | 46.8                               |
| West South Central:       |  |                               |                               |                       |                                    |
| Arkansas.....             | 2.17   | 4,071                         | 7.8                           | 22.4                  | 37.7                               |
| Louisiana.....            | 2.67   | 7,519                         | 6.6                           | 33.1                  | 47.8                               |
| Oklahoma.....             | 2.06   | 4,666                         | 8.7                           | 9.0                   | 42.6                               |
| Texas.....                | 2.29   | 18,753                        | 6.8                           | 11.5                  | 52.0                               |
| Mountain:                 |  |                               |                               |                       |                                    |
| Montana.....              | 1.71   | 1,011                         | 8.6                           | 3.2                   | 36.2                               |
| Idaho.....                | 1.54   | 936                           | 7.4                           | 1.2                   | 34.6                               |
| Wyoming.....              | 1.71   | 527                           | 6.3                           | 2.2                   | 41.3                               |
| Colorado.....             | 2.13   | 3,048                         | 8.7                           | 2.1                   | 50.4                               |
| New Mexico.....           | 3.42   | 2,480                         | 4.9                           | 7.5                   | 95.3                               |
| Arizona.....              | 3.02   | 2,594                         | 5.9                           | 12.7                  | 76.5                               |
| Utah.....                 | 1.40   | 1,032                         | 6.2                           | 1.7                   | 31.9                               |
| Nevada.....               | 2.11   | 380                           | 6.9                           | 6.4                   | 50.0                               |
| Pacific:                  |  |                               |                               |                       |                                    |
| Washington.....           | 1.65   | 4,071                         | 8.9                           | 2.6                   | 34.2                               |
| Oregon.....               | 1.49   | 2,375                         | 8.7                           | 1.6                   | 30.0                               |
| California.....           | 1.70   | 19,363                        | 8.2                           | 6.0                   | 34.4                               |

<sup>1</sup> See text for method of estimation.

<sup>2</sup> Obtained by applying estimated rates to population estimates as of July 1, 1952, of the Bureau of the Census (*Current Population Reports*, Series P-25, No. 70). The estimated numbers of blind persons are shown unrounded as computed but are not assumed to be

significant to that extent.

<sup>3</sup> Bureau of the Census, 1950 *Census of Population*, Preliminary Reports, Series PC-6, Nos. 1-10; PC-12, Nos. 1-39.

<sup>4</sup> Average of the State rates weighted by the State populations.

blind were probably either totally without sight or had light perception only. The rates for nonwhite persons were found to be from two to three times as high as those for white persons, with differences greater in southern than in northern cities.<sup>6</sup> Higher rates for the nonwhite population were also found in attempts made before 1940 to enumerate the blind in the decennial population censuses, and the same result has been obtained repeatedly in local surveys. There is no evidence, however, that the racial factor represents a true biological influence. Instead, the influence of race is probably a reflection of less education and much lower economic standards of the Negro and Indian than of the white portions of the population, which in turn have affected their ability to withstand disease.

Values representing the three factors were converted to percentages of the respective values for the United States and then combined, weights being assigned to the relative figures to give the variation of each of the factors its assumed appropriate influence in determining differences in the rates. The age percentages were multiplied by four; the race percentages by two; and those for the general health factor by 10. From the series of aggregate weighted relatives so obtained, the prevalence rates were calculated by relating the series of aggregate numbers to the rate of blindness for one state. The series of estimated prevalence rates is, in fact, anchored on a rate for North Carolina computed from an actual count of blind persons in that state, made by the State Commission for the Blind as of the end of June 1952.

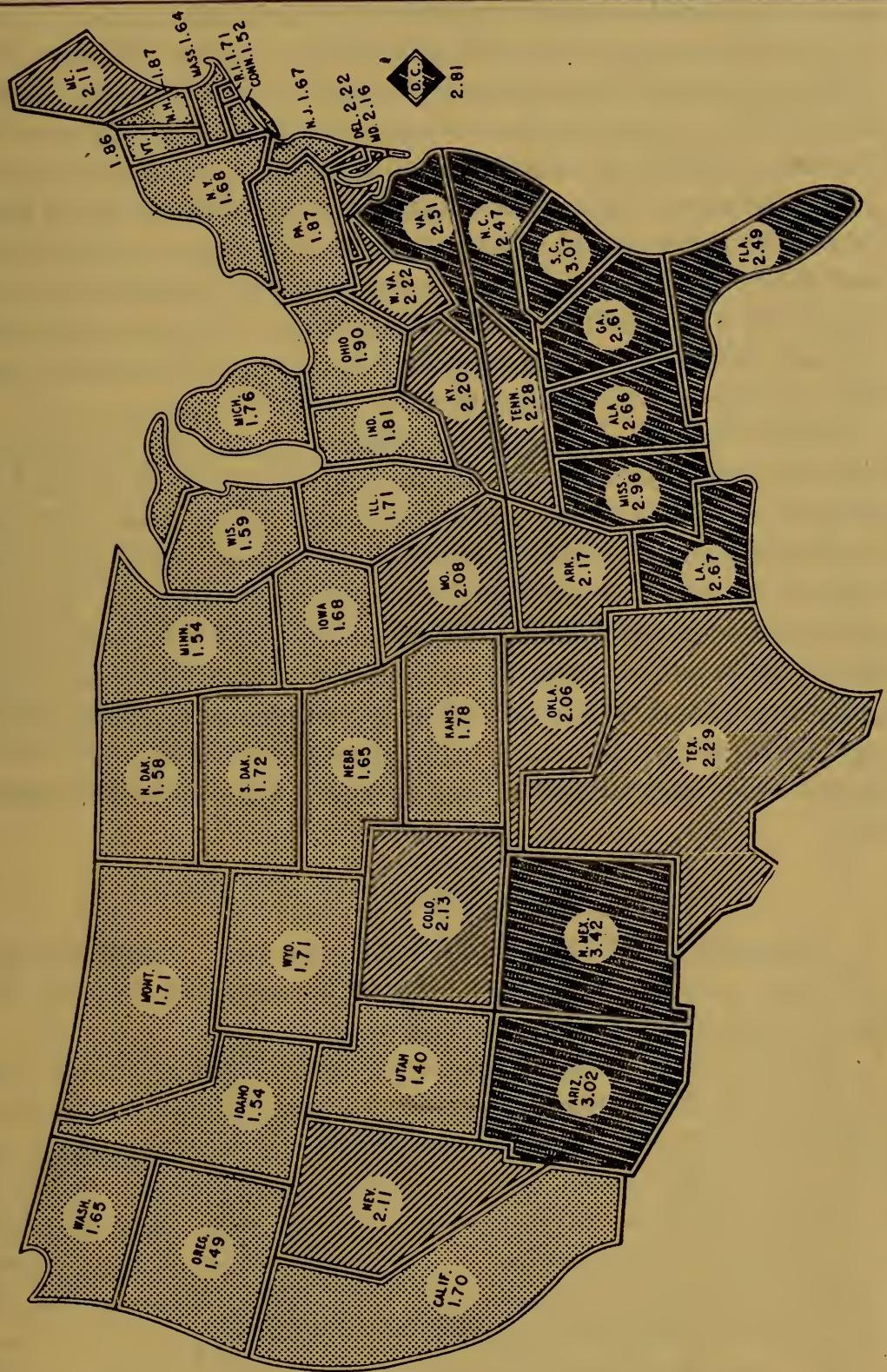
### *Regional Differences*

As expected, the estimated rates differ rather widely. The lowest, 1.40 blind persons per thousand population, is that for Utah, which has one of the lowest proportions of older persons in its population, very little nonwhite population, and one of the lowest infant death rates. Oregon has the next lowest estimated rate. It has, with Connecticut, the lowest of the infant death rates, but the proportion of older persons is a little higher than the average for the nation. At the other extreme is New Mexico with a

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<sup>6</sup> Rollo H. Britten, "Blindness as Recorded in the National Health Survey . . .," *Public Health Reports*, Vol. 56, No. 46, 1941, p. 17.

Estimated Rates of Prevalence of Blindness in the United States: Sectional Differences, July 1, 1952



calculated rate of 3.42 per thousand, explained by its exceptionally high infant death rate, even though its proportion of older persons is lower than that for any other state and its recorded ratio of non-white population lower than average. South Carolina and Arizona follow New Mexico, with rates higher than 3.0 blind persons per thousand population. South Carolina has next to the highest proportion of nonwhite population and one of the higher infant death rates. The exceptionally high infant death rates for both Arizona and New Mexico reflect in part the low health standards of the relatively large portion of their population that is of Mexican-Indian parentage. This group is not represented by the percentages for nonwhite persons in the population.

The estimated rates reveal a marked geographic relationship, as is illustrated in the accompanying map. With Arizona and New Mexico, all the Gulf and Atlantic seaboard states from Louisiana to Virginia and the District of Columbia have rates higher than 2.4 per thousand. For most of the states comprising a zone just north of the group with the highest rates, and for Nevada, Texas, Oklahoma, and Missouri, the estimated rates are between 2.0 and 2.3 per thousand. Maine also falls in this category, having both a high infant death rate and a high proportion of older persons. For all the other states the rates are less than 2.0 per thousand population.

#### *North Carolina Census of Blind Persons*

As already stated, for North Carolina the rate of blindness given in Table 1 is based on an actual count of blind persons. The quality of this figure deserves discussion.

The North Carolina Commission for the Blind administers an exceptionally comprehensive program of services for blind persons. It includes federal-state aid to the blind, home teaching and social services, rehabilitation service, employment service, sheltered workshop and home industries, and medical care designed to prevent blindness and to conserve and restore vision among persons unable to purchase such service for themselves. These services are provided to persons throughout the state. The program has a sizable staff; the social service division, for example, has a field staff of six supervisors and 30 caseworkers.

The legislation that established the Commission for the Blind in 1935 contained a provision making mandatory the maintenance of a complete register of blind persons in the state and the compilation of appropriate information concerning them. The register was begun in the Commission's early years with the assistance of a WPA project. In recent years the register has approached completeness, and the Commission staff believes that it now represents a reasonably accurate enumeration of persons in the state who are blind within the state's definition of blindness, which includes central visual acuity of 20/200 or less in the better eye, with correction, or other equally disabling visual loss.

The register of the blind is kept current, with additions and subtractions based on reports from members of the field staff, from eye clinics operated by the Commission and by others, and from individual physicians complying with a state law that requires the reporting of blindness of patients. Information widely distributed through the state concerning the facilities of the Commission for eye examination and treatment and other services for persons with defective vision also helps to keep the register up to date. Preceding the end of each biennium a thorough validation of the register

*Table 2.—Prevalence of blindness in  
North Carolina, June 30, 1952*

| Classification   | Number<br>of blind<br>persons <sup>1</sup> | Rate<br>per 1,000<br>population <sup>2</sup> |
|------------------|--|--|
| Total.....       | 10,318                                     | 2.47   |
| Sex:             |  |  |
| Male.....        | 5,535                                      | 2.67   |
| Female.....      | 4,783                                      | 2.27   |
| Race:            |  |  |
| White.....       | 6,248                                      | 2.04   |
| Nonwhite.....    | 4,070                                      | 3.67   |
| Present age:     |  |  |
| Under 6.....     | 130  | .22  |
| 6-14.....        | 485  | .65  |
| 15-24.....       | 871  | 1.17   |
| 25-44.....       | 1,818                                      | 1.50   |
| 45-64.....       | 2,354                                      | 3.66   |
| 65 and over..... | 4,492                                      | 19.53  |
| Unknown.....     | 168  | .....  |

<sup>1</sup> Biennial Report of the North Carolina State Commission for the Blind, July 1, 1950 through June 30, 1952, p. 55.

<sup>2</sup> Population of the State estimated by the Bureau of the Census as of July 1, 1952, has been used; its distribution is assumed to be in the same proportions as on April 1, 1950. (1950 Census of Population, Preliminary Reports, Series PC-12, No. 25.)

is made. This validation at the end of June 1952 resulted in a count of 10,318 blind persons and a rate of 2.47 per thousands of estimated population.

The count obtained from this verified register is designated a census of the blind in the Commission's report. The 1952 report contains a tabulation recording, among other data, the sex, race, and present age classification of the blind persons in four regions and in each county of the state.<sup>7</sup> From the statistics in this report, the prevalence rates by sex, race, and age shown in Table 2 have been computed, using the Bureau of the Census population figures for the state for July 1, 1952, and the distribution of the population as found in the 1950 Census. These rates show relationships for the respective classifications that tend strongly to confirm the Commission's belief that the register has supplied an approximately complete and accurate enumeration.

#### *Trend of Prevalence of Blindness*

It would be fortunate if the present method of making estimates could be relied upon to support conclusions as to the increase or decrease of the rate of this handicap. The method was designed, however, to approximate differences in the rates for states or sections of the country at a given time. It does not serve equally well for estimating changes with time, largely because of the importance of the health factor and the lack of suitable measurement to represent it at successive periods.

Estimates made by this method for 1940 placed the number of blind persons in the United States at approximately 230,000 and the prevalence rate at 1.75 per thousand population. Assuming no change in the rate, estimates for 1948 gave the total number of blind persons as 255,000, as compared with the present total figure, 308,000. The weights used in the formula have been changed, however, in obtaining the present estimates, as has also the basis of the anchor rate.

Because cataract, glaucoma, and other eye diseases occurring most frequently among older persons probably now account for at least two-thirds of existing blindness, and because the proportion

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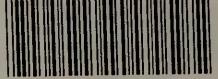
<sup>7</sup> *Biennial Report of the North Carolina State Commission for the Blind, July 1, 1950, through June 30, 1952*, p. 55.

of the population aged 65 or over increased by almost 20 percent from 1940 to 1950 and is continuing to increase, it is not unreasonable to suppose that the prevalence rate of blindness, as well as the number of blind persons, is now increasing. The maintenance by more states of carefully developed local statistics, such as those of North Carolina, will help to provide an answer to this question.

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